further calculates that |(x_j, y_j)−(a_i, b_i)|=sqrt((x_j−a_i)*(x_j−a_i)−(y_j −b_i)*(y_j−b_i)) as being the distance between the touch point of j and the sensor i. The notation "sqrt" is representative of square root.

[0026] Further referring to **FIG. 4** and the equation contained within the software algorithm of DSP **50**, the equation calculates that the pressure measured at strain gauge **16**, and "i" is a summation of the pressure components caused by multiple touch points. Each pressure component is a function of the pressure of the corresponding touch point, the distance between the touch point and the location of the sensor. The farther the distance between a touch point and an individual strain gauge **16**, the less effect the touch point has on the strain gauge **16**. By solving the equation for the unknown values, the locations and the pressures of the multiple touch points will be determined. The results of the calculations performed in DSP calculation module **106** are then outputted via a DSP output module **108** to an application as illustrated in an application module **110**.

[0027] Referring back to **FIG. 2, a** multi-point touch pad **10** contains strain gauges **16** which are connected to DSP **50** through sensor wires **36**. DSP **50** is further connected to application board **60** which would control the applications utilizing the output signals from DSP **50**. Applications controlled by application board **60** may include computer equipment, videogame controllers, music devices, alternative keyboards and the like.

[0028] While the invention has been described in connection with preferred embodiments, it will be understood that modifications thereof within the principles outlined above will be evident to those skilled in the art and thus, the invention is not limited to the preferred embodiments but is intended to encompass such modifications.

What is claimed is:

1. A multi-point touch pad, comprising:

a touch layer having a top surface and a bottom surface and a plurality of pressure sensing devices coupled to the bottom surface of the touch layer such that touch pressure applied to the top surface will impart pressure to the pressure sensing devices near the location of the touch pressure;

each pressure sensing device coupled to a processor constructed to calculate the location of at least two points on the top surface being touched, based on pressure sensing readings from the pressure sensors.

2. The touch pad of claim 1, wherein the processor is also constructed to calculate the pressure applied at each point being touched.

3. The touch pad of claim 1, wherein the pressure sensing device comprises a sensor selected from the group consisting of force sensing resistors, piezoelectric sensors and capacitive touch sensors.

4. The touch pad of claim 1, wherein the pressure sensing device comprises a strain gauge.

5. The touch pad of claim 1, wherein the processor is a digital signal processor (DSP).

6. The touch pad of claim 1, wherein the pressure sensors are arranged in a matrix.

7. The touch pad of claim 4, wherein the sensors are arranged in a matrix.

8. The touch pad of claim 1, wherein the processor is constructed to perform the following algorithm:

a. sampling the pressure sensing signals from the plurality of pressure sensing devices;

b. calculating locations of single or multiple touches on the touch pad;

c. calculating the amount of pressure exerted on each touch on the touch pad;

d. outputting calculation data.

9. The touch pad of claim 8, wherein the processor is constructed to perform the algorithm which contains the known positions of the strain gauges on the multi-point touch pad;

positions are identified with the following formula: (a_i, b_i), i=1, 2, . . . , N, where N is the number of strain gauges, and the measured pressures of strain gauges are p_i, i=1, 2, . . . N;

the positions of the touch points on multi-point touch pad are identified with the following formula: (x_j, y_j), j=1, 2, . . . , M, where M is a known number of the touch points (less than N), but x_j and y_j are unknown and will be determined by the calculations of the formula;

the pressures of the touch points are identified with the formula: z_j, j=1, 2, . . . , M, which are also to be calculated using the algorithm;

the algorithm transfers the sampling data from a DSP sampling module to a processor calculation module where the algorithm calculates the position and pressure of the touch points using the following mathematical formula: p_i=w(|(x_1, y_1)−(a_i, b_i)|)z_1+w(|(x_2, y_2)−(a_i, b_i)|)z_2+. . . +w(|(x_M, y_M)−(a_i, b_i)|)z_M, i=1, . . . , N; where w(|(x_i, y_j)−(a_i, b_i)|) is a weighting factor that reflects the effect of pressure z_j on p_i;

the algorithm calculates that: w(|(x_i, y_j)−(a_i, b_i)|) is a function of the distance between the touch point (x_j, y_j) and the sensor location (a_i, b_i);

the algorithm calculates that |(x_j, y_j)−(a_i, b_j)|=sqrt((x_−a_i)*(x_j−a_i)−(y_j−b_i)*(y_j−b_i)) as being the distance between the touch point of j and the sensor i using the notation "sqrt" as being representative of square root.

10. A method of controlling an application with a touch pad, comprising the steps of:

providing a touch pad having a touch surface with a bottom and a top and a plurality of pressure sensors arranged under the touch surface and coupled to the bottom of the touch surface;

touching the top of the touch surface at at least two points;

sending a signal to a processor corresponding to the pressure at each sensor;

performing an algorithm to determine the location of the at least 2 touch points based on comparing the pressure at each of the sensors.